the oxide, than dry wood, coal, or sulphur. A single grain of camphor, dissolved in an adequate portion of alcohol, was found sufficient, when assisted by a red heat, to render all the particles of 100 grains of the oxide magnetic. But such substances as are easily sublimed, will, by a continued application even of a low heat, quit the oxide, leaving it, as at first, unmagnetic. Hence we may understand why Prussian blue, sulphurets, and ores of iron, containing inflammable matter, become magnetic by the agency of heat, and revert to their unmagnetic state if the heat is continued long enough to drive off the inflammable matter.

The intention of this paper, Mr. Lane says, is to prove that mere oxides of iron are not magnetic; that inflammable substances do not render them magnetic until such substances are, by heat, chemically combined with them; and that when the combustible substance is again separated by heat, the oxides return to their unmagnetic state.

Additional Experiments and Remarks on an artificial Substance, which possesses the principal characteristic Properties of Tannin. *By* Charles Hatchett, *Esq. F.R.S.* Read June 27, 1805. [*Phil. Trans.* 1805, *p.* 285.]

Mr. Hatchett was, he says, at first inclined to consider the artificial tanning product as exactly similar to the natural vegetable principle called tannin; but as there appeared to be a considerable difference between them with respect to the effect of nitric acid (which acid produces the one while it destroys the other), he thought it necessary to make some experiments on the comparative effects of this acid on those substances which contain the largest proportions of tannin.

He accordingly subjected the artificial product, sometimes alone, and sometimes mixed with other substances, to the action of nitric acid; and although Mr. Hatchett cannot, he says, assert that this substance is absolutely indestructible when repeatedly distilled with that acid, yet the results of his experiments showed that the destruction of it, by that means, would be a work of considerable time and difficulty.

Muriatic acid also, appeared to have no effect on this substance; and Mr. Hatchett remarks, that the solutions of it seem to be completely imputrescible, also, that they do not become mouldy, like the infusions of galls, sumach, &c.

Some comparative experiments were then made, by means of nitric acid, on galls, sumach, Pegu cutch, kascutti, common cutch, and oak-bark; from which it appeared, that although the artificial product is by much the most indestructible of all the tanning substances, yet there is some difference in that respect between the various kinds of natural tannin; common cutch and the tannin of oak-bark resisting the effects of nitric acid much more than galls, sumach, kascutti, and Pegu cutch.

A number of miscellaneous experiments on the substance here

treated of are then described, of which we shall only mention one, made to show the effects of heat upon it.

Twenty grains of the substance, prepared by means of nitric acid from pure vegetable charcoal, were subjected to a high degree of heat in a glass retort. A small quantity of nitric acid, from which the substance had not been entirely freed, first came over; after this a considerable quantity of ammonia was suddenly produced, which was succeeded by carbonic acid and a small quantity of nitrogen gas. A bulky coal, weighing $8\frac{1}{2}$ grains, remained, which, by incineration, yielded $1\frac{1}{2}$ grain of brownish white ashes, consisting principally of lime.

Mr. Hatchett now relates an experiment made with indigo, by which he ascertained, that a variety of the vegetable tanning substance might be formed without previously converting the vegetable body into coal; and he has, he says, since discovered, that although indigo yields this substance more readily than most other vegetable bodies, yet very few of those bodies are to be considered as exceptions. He had in his former paper stated, that in his experiments upon common resin it was necessary to develope part of the carbon in the state of coal by sulphuric acid, in order to produce the tanning substance; but he has since found, that when the abstraction of nitric acid was several times repeated, that substance might be obtained not only from common resin, but also from several other resinous bodies.

In the course of these experiments Mr. Hatchett found, that by treating dragon's blood with nitric acid, a feather-like sublimate was produced, which had the aspect, odour, and properties of benzoic acid, although no vestige of this acid could be obtained by simply exposing the dragon's blood to heat. Guaiacum, although similar in its general character to resins, when treated as above, yielded only slight vestiges of the tanning product, but, like the gums, afforded a large quantity of oxalic acid.

In the following section Mr. Hatchett observes, that the decoctions of several roasted vegetable substances did not afford any precipitate with a solution of isinglass; even a decoction of coffee did not afford a precipitate until several hours had elapsed; but by adding a small quantity of nitric acid to any of the above decoctions, the tanning substance might be procured from them.

Lastly, the author describes some experiments made by him in order to procure the tanning substance from camphor. For this purpose 100 grains of camphor were dissolved in sulphuric acid, and, after four days, at which time the production of sulphureous acid gas had nearly ceased, cold water was added, and the whole was subjected to distillation; by this, about 3 grains of an essential oil were obtained; and as by a second distillation with water no more essential oil came over, the residuum was treated with successive portions of alcohol until that solvent ceased to act upon it. The residuum had now the appearance of a compact coal, and after desiccation weighed 53 grains. The solution formed by alcohol, upon being

distilled, left a blackish brown substance, weighing 49 grains. This substance appeared, by experiments made upon it, to be a variety of the artificial tanning matter, much resembling that obtained from resinous bodies by means of sulphuric acid; but it is remarkable, that when a small quantity of nitric acid was added to an aqueous solution of the substance obtained from camphor, and, after evaporation to dryness, the residuum was dissolved in water, a reddish brown liquid was formed, which acted in a manner exactly similar to the tanning substance obtained from carbonaceous substances by nitric acid.

On the Discovery of Palladium; with Observations on other Substances found with Platina. By William Hyde Wollaston, *M.D. Sec. R.S.* Read July 4, 1805. [*Phil. Trans.* 1805, *p.* 316.]

In this paper the author relates circumstantially the series of operations by which he was led to the original discovery of palladium; and as he had an opportunity during the solution of a considerable quantity of platina, of making many observations that have not occurred to others, he undertakes, on the present occasion, to mention those which are most worthy of notice.

He remarks, that the gold which is usually found with platina is a constituent part of the ore of platina itself, when the grains are carefully selected.

The metals iridium and osmium, on the contrary, which were extracted by Mr. Tennant from the black powder that remains after solution of the ore of platina, Dr. Wollaston observes, are not only to be found in that powder which is extricated by solution from the interior of the grains of crude platina, but there exist also other grains originally distinct from those of platina, and consisting of these metals only.

These grains, which he considers as the proper ore of iridium mineralized by osmium, are harder than those of platina, are more brittle under the hammer, and when broken appear to be laminated.

The specific gravity of these grains, he says, is very remarkable, being greater than that of the ore of platina, which in his experiments has not exceeded 17·7, while that of the former is as much as 19·5. It would naturally be supposed that such a density might arise from the presence of a large quantity of platina in them; but the author did not succeed in obtaining any platina from these grains.

Among the various substances that may be separated from the ore of platina by washing, he notices also certain minute crystals of the colour of the ruby. Of these he gives a particular description, but does not undertake the analysis, on account of the very small quantity which he could obtain.

The author next proceeds to the solution of platina, from which he first precipitates the greater part of the platina pure, by sal ammoniac, and the remainder in an impure state by iron, a second metallic precipitate, which he observes consists of various metals intermixed.